SUBMARINE RAILWAYS.

In our impression of the 13th ult., we announced that Mr. De La Haye of Liverpool had, after long consideration, satisfied himself of the practicability of constructing *Railways in rivers and narrow seas*? Since then he has forwarded a communication on the subject to the *Mining Journal*, in which he not only explains how certain difficulties may be overcome, but also points out many advantages which may result from his project. He says:

"The idea of extending railways in the liquid element will undoubtedly appear formidable at first thought; we are accustomed to consider the sea as a barrier which can only be overcome by gliding on its surface, yet what is water but a fluid more dense than that which we breathe? Man has found means to enter it with facility, and to conduct difficult operations at considerable depths; breakwaters, bridges, &c., are constructed in channels where they are exposed to the fury of the sea during terrible gales. The breakwater at Cherbourg extends three miles in the sea, in sixty feet of water, forming a vast harbour for vessels. May it not be supposed, then, that we may construct a road *through* the water, without boring under its bed? The subject may be of sufficient importance to enter into some examination as to its practicability.

My plan is simply to construct wrought iron tunnels in separate divisions, to sink them on the bed of the water, and then to connect them, so as to render the whole as one vast building; these few words contain the sum total of the principle of the scheme, but, of course, to enter into the minute details would occupy a great deal of space, and, in fact, would require a number of diagrams. At present I would wish to call the attention of the scientific world to the principle of the plan, and, perhaps, these remarks may lead to the subject being discussed among those individuals who are interested in the progress of science. In England there are many rivers with towns on either side, between which a communication on *terra firma* would be of considerable importance, not only as regards the local traffic, but by the means of continuing important railways without deviating the lines. Of these towns Liverpool and Birkenhead are, perhaps, of the greatest importance, also North and South Shields. Submarine railways would be also of very considerable use in different parts of the Severn, but it would be impossible to name two places separated by the sea to which the construction of a submarine railway would be of greater importance than Dover and Calais; this railway would connect the two greatest countries on earth; it would also be to England the door to the Continent, and to the Continent the door to England. On that road a greater amount of traffic would be carried than on any other railway that has been or ever will be constructed; the immense treasures contained in the mines of Britain would find their way to the continent, a stimulus given to manufactures as yet unknown; commercially speaking, the whole of Europe would become as one vast country, one part exchanging its superfluous produce for the manufactures of the other part; every thing would have its full value by finding its level.

It is probable, however, that many persons will view this scheme with scepticism; this may be expected, by its being both novel and gigantic, yet may not consideration make that which appears at first thought as insurmountable, afterwards easy and plain. It will be admitted that to construct such a tunnel would be an easier matter than to build iron vessels, as it would be the same shape the whole length; then to sink it on the bed of the water would be the work of only a few hours for each division of 400 feet in length; perhaps that part of the work which will appear the most complicated will be to connect the divisions under water; to this part of the work I have given peculiar attention, and I believe that I have so far succeeded in finding means to accomplish this object, that the operation will be attended with no extraordinary difficulty to those who can remain during half an hour in deep water. The diver would use no other tool than a large hammer —in fact, I think that means will be found to connect the divisions temporarily, outside, without descending at all in the sea. Then, with a view of diminishing the number of joints, several of the divisions might be joined together on the sea-shore, at low tide, and the whole, thus joined permanently, be sunk in their position. Improvements would, of course, suggest themselves as to the mode of operating to those who would direct the work in its details.

I may be asked how I would protect the tunnel from injury in a channel where the storm is often felt so violently; in answer to this question, I refer to those who have proved that the sea is never agitated in great depths; from ten to twenty feet is supposed to be the greatest depth in which the storm is felt; this seems in accordance with the laws of Nature, for if the sea was ever violently agitated below, where could the myriads of living creatures in its bosom find shelter, so as not to be dashed against the rocks; this supposition alone, if there was no other, would be sufficient to demonstrate the fact of the sea being perfectly calm below during the most violent storms; thus the water, instead of injuring the building, would be a valuable protection to it. As regards that part of the tunnel which would be near the shore, it would be sunk underground and covered with stones fastened together, so as to render them immoveable, even when the waves would roll over with the greatest fury.

On examining this plan, it will be seen that the practicability does not depend on a number of operations new to science; it is only by the application of the most simple arts that I propose to attain the object of forming submarine railways, a project of considerable magnitude, certainly, when we consider an iron tunnel as one building, but which, when we examine in detail, seems only a work which an ordinary boiler-maker would undertake to execute. The divisions might be built in different sea-ports, as they could be towed to the required spot by being made to float; by these means the whole could be built in a very short space of time, and the road completed in little more time than would be occupied in constructing an ordinary railway. There is, however, another item of importance which must not be lost sight of—I mean the expense. This will be, perhaps, the greatest objection, which will be started by many persons; let, however, the probable cost of constructing the divisions be calculated, and if the price of iron at present be considered, the expense will not be so immense as might be supposed. The tunnel is to be merely a rough wrought-iron tube, and shaped with no other tools than those used by boiler-makers; this tube is to be placed on a spot which no mortal can claim as his own—consequently, no landowner will pocket a shilling of the money raised by the shareholders. Then the railway will be formed in forming the tube; there will be no hills to cut through, valleys to fill up, or arches to build; in short, the sum total of the work is comprised in the tunnel itself; when complete, the road is open, and perhaps no other railway could be so easily kept in order, and with so little expense.

The first submarine railways that would be made would, probably, be short lines; by these the practicability of the plan would be tested; perhaps it will not be until then that the plausibility of the scheme will be evident to every one; it is only after a thing of importance has been carried out that we see its simplicity, or in the words of Bacon, "When any thing is first projected, we think it impossible; then, after, we think it strange that it was not attempted before."

I may here remark that I do not believe that steam will be superseded by any other power during the present age. Steam, as a motive power, has not been given to mortals to have such a short reign; probably it will last as long as the art of printing has already done. Improvements will undoubtedly take place, but the principle will remain the same. Nature does not reveal the whole of her secrets at once, but only as they are required, according to the use which man has made of those entrusted to him: the history of the world will prove it. It is probable that in future ages men will discover a power which will make as much revolution as steam, but at present the business of man is to apply that power where it is possible, so as to connect the most distant places. The plan which I propose is to facilitate its universal application, and if the scientific world will examine the subject, the day may not be far distant when the flying locomotive will roll under the iron arch supporting the liquid element.

RAILWAY CLUB.

A Meeting of gentlemen connected with Railways was held last week at the London Tavern, at which Sir George William Prescott, bart., presided, amongst those present where the Hon. Mr. Gore, Messrs. Meteyard, T. Arnold, and W. J. Arnold. The chairman explained, that the object of the meeting (which was of preliminary character) was to adopt measures for the formation of a club to be composed of railway directors and parties interested in railways, for the interchange and record of valuable information connected with them. The proposition had already the approbation by letter of upwards of 150 noblemen and gentlemen, directors of railways. Mr. Owen, solicitor, and other gentlemen, addressed the meeting, and urged that the proposed plan would have the effect of diffusing railway intelligence generally, particularly as respects the geological state of the country, and the improvements of locomotive engines, &c.; and a resolution in conformity with the objects of the meeting was adopted. It was suggested to the Committee which was formed, that professors of geology, &c. be appointed to give occasional lectures. One gentleman observed that a new Bourse should be established, to be devoted exclusively to railways.

Mr. Edward Burbidge was appointed provisional secretary, and temporary offices have been taken at No. 1, Moorgate.

MAJOR PARLBY'S SYSTEM OF SAFETY RAILWAYS AND CARRIAGES.

Models and descriptions of the several inventions connected with this system are being prepared and will be ready for examination very shortly; in the meantime Major Parlby invites the attention of engineers, railway directors, and others, to the following statement of advantages which his system embraces:—

"The carriages cannot by any possibility run off the rails, or be overturned. Curves of short radii may be used on any part of a line without danger. The centre of gravity is brought as low as possible by the floors of the carriages being within a few inches of the rails, and thus no steps or platforms will be required; and if an axle should break, or a wheel come off, the carriage will slide along upon the rails without further accident. The breaks are strong sliding frames attached to the carriages, which can be brought at any time to slide upon the rails—thus acting by friction upon them: therefore the dangerous effects of violent torsion which the wheels and axles sustain by the application of the usual breaks is entirely avoided. In the Croydon and Dalkey atmospheric lines, on Mr. Samuda's plan, the first carriage only is attached by a metal tongue to the piston of the tube, and thus the following carriages are only kept on the rails by the flanges of the wheels, which causes excessive wearing friction of both wheels and rails, and great danger in passing curves at high velocities. The same remarks apply to Pilbrow's system; only the first carriage being kept on the rails by the rack running between the stationary pinions, and the remaining carriages depending on the flanges of the wheels to keep them on the rails. By the adoption of my system *every carriage* will be equally secure from running off the rails. The wheels have no flanges, but are perfectly cylindrical, or slightly convex, on the edges; thus they will move with less friction than flanged wheels, and can be made at less expense. The baggage of every passenger will travel in and upon the same carriage as himself, thus preventing those inconvenient separations and confusion of passengers and baggage which often occur. The rails can be formed, especially for atmospheric lines, at the expense of about 16½ lbs. of iron per yard, instead of 40, 50, 60, and 70 lbs., as now used. Several lines of carriages can stand ready, arrive at, or move from, any atmospheric station, without confusion or danger of collision. No turn tables will be required at the stations to move the carriages on or off the lines. The wheels of the carriages cannot run over any body lying on the rails; thus the dreadful accidents of mutilated human beings, so constantly occurring, will be prevented. The carriages, having no buffers, or springs,

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